

In the Claims:

1. (Previously presented) An ionizing radiation sensitive liposome delivery system, comprising a stable liposome-forming lipid and an ionizing radiation polymerizable colipid; wherein after administration to a patient the colipids are clustered in discrete domains.

Claims 2-3. Canceled.

4. (Previously presented) The liposome delivery system of claim 1, comprising from about 5 % to about 40 % polymerizable colipid.

5. (Previously presented) The liposome delivery system of claim 1, wherein the liposome further comprises a steric stabilizer.

6. (Previously presented) The liposome delivery system of claim 5, comprising from about 2 % to about 20 % steric stabilizer.

7. (Previously presented) The liposome delivery system of claim 5, comprising from about 5 % to about 40 % polymerizable colipid and from about 2 % to about 20 % steric stabilizer.

8. (Previously presented) The liposome delivery system of claim 5, wherein the steric stabilizer is a poly (ethylene glycol).

9. (Previously presented) The liposome delivery system of claim 1, wherein said polymerizable colipid is selected from the group consisting of mono-, bis-, and heterobifunctional, diacetylenyl, acryloyl, methacryloyl, dienoyl, dienyl, sorbyl, muconyl, styryl, vinyl, and lipoyl colipid.

10. (Previously presented) The liposome delivery system of claim 1, further comprising a releasable agent.
11. (Previously presented) The liposome delivery system of claim 10, comprising from about 5 % to about 40 % polymerizable colipid.
12. (Previously presented) The liposome delivery system of claim 10, wherein the liposome further comprises a steric stabilizer.
13. (Previously presented) The liposome delivery system of claim 12, comprising from about 2 % to about 20 % steric stabilizer.
14. (Previously presented) The liposome delivery system of claim 12, comprising from about 5 % to about 40 % polymerizable colipid and from about 2 % to about 20 % steric stabilizer.
15. (Previously presented) The liposome delivery system of claim 12, wherein the steric stabilizer is a poly (ethylene glycol).
16. (Previously presented) The liposome delivery system of claim 10, wherein said polymerizable colipid is selected from the group consisting of mono-, bis-, and heterobifunctional, diacetylenyl, acryloyl, methacryloyl, dienoyl, dienyl, sorbyl, muconyl, styryl, vinyl, and lipoyl colipid.
17. (Previously presented) The liposome delivery system of claim 10, wherein the releasable agent is a water soluble molecule.
18. (Previously presented) The liposome delivery system of claim 10, wherein the releasable agent is a lipid associated molecule.

19. (Previously presented) A pharmaceutical composition comprising a liposome delivery system of claim 10, wherein the releasable agent is a therapeutic agent encapsulated in or associated with the liposome, and a pharmaceutically acceptable carrier or diluent.

20. (Previously presented) A method of treating a condition responsive to a therapeutic agent, comprising the steps of:

- (i) administering to a patient a pharmaceutical composition comprising an ionizing radiation sensitive liposome delivery system, comprising a stable liposome-forming lipid, an ionizing radiation polymerizable colipid; and a releasable therapeutic agent;
- (ii) subjecting the patient to ionizing radiation to polymerize a fraction of said colipid, destabilize the liposome and release the therapeutic agent.

21. (Original) The method of claim 20, wherein the radiation ranges from about 5 to about 500 rads.

22. (Original) The method of claim 21, wherein the radiation ranges from about 50 to about 250 rads.

23. (Previously presented) A pharmaceutical composition comprising the liposome delivery system of claim 10, wherein the releasable agent is a diagnostic agent encapsulated in or associated with the liposome, and a pharmaceutically acceptable carrier or diluent.

24. (Previously presented) A method of diagnosing the presence or progression of a disease, comprising the steps of:

- (i) administering to a patient a diagnostic composition comprising an ionizing radiation sensitive liposome delivery system, comprising a stable liposome-forming lipid, an ionizing radiation polymerizable colipid; and a releasable diagnostic agent,
- (ii) subjecting the patient to ionizing radiation in order to destabilize the liposome delivery system and release the diagnostic agent; and

(iii) diagnosing said disease through the use of molecular imaging techniques.

25. (Original) The method of claim 24, wherein the radiation ranges from about 5 to about 500 rads.

26. (Original) The method of claim 25, wherein the radiation ranges from about 50 to about 250 rads.

27. (Previously presented) A method of producing an ionizing radiation sensitive liposome delivery system, comprising the steps of:

- (i) selecting a stable liposome-forming lipid and an ionizing radiation polymerizable colipid;
- (ii) drying the lipids and colipids that comprise the liposome,
- (iii) hydrating said lipids and colipids with a buffer, comprising agents to be encapsulated or associated in a desired molar ratio to create hydrated bilayers,
- (iv) converting said bilayers into liposomes; and
- (v) purifying the liposomes

to form a liposome delivery system wherein after administration to a patient the colipids are clustered in discrete domains.

28. (Previously presented) The method of claim 27, wherein the lipids and colipids are dried under a stream of an oxygen-free gas.

29. (Original) The method of claim 27, wherein the encapsulated or associated agents are therapeutic or diagnostic agents.

30. (Previously presented) The method of claim 27, wherein the bilayers are converted into liposomes by ultrasonification or freeze-thawing followed by extrusion.

31. (Original) The method of claim 27, wherein the liposomes are purified by gel permeation chromatography.

32. (Previously presented) A radiation sensitive liposome delivery system that can be targeted to a tumor site through attachment of at least one targeting peptide to the liposome of claim 10.

33. (Previously presented) The radiation sensitive liposome delivery system of claim 32, wherein the peptide is selected from the group consisting of antibodies, antibody fragments, and antigens.

34. (Previously presented) The liposome delivery system of Claim 1, comprising PEG₂₀₀₀-distearoylPE, cholesterol, distearoylPC and bis-SorbPC_{17,17}.

35. (Previously presented) The liposome delivery system of Claim 1, comprising PEG₂₀₀₀-distearoylPE, distearoylPC and bis-SorbPC_{17,17}.

36. (Previously presented) A liposomal delivery system of Claim 1 wherein only about 5% of lipids are polymerized to cause destabilization of the liposomal membrane.

37. (Previously presented) An ionizing radiation sensitive liposome delivery system, comprising a stable liposome-forming lipid, a steric stabilizer and an ionizing radiation polymerizable colipid.

38. (Previously presented) An ionizing radiation sensitive liposome delivery system, comprising a stable liposome-forming lipid, cholesterol and an ionizing radiation polymerizable colipid.

39. (Previously presented) An ionizing radiation sensitive liposome delivery system, comprising a stable liposome-forming lipid and an ionizing radiation polymerizable colipid

where the ionizing radiation polymerizable colipid is not 1,2 Bis[10-(2',4'-hexadienolyoxy)decanoyl]-sn-glycero-d-phosphatidylcholine when the stable liposome-forming lipid is dioleoylphosphatidylethanolamine or dioleoylphosphatidylcholine.